Press Release

New EU Project "ENVESOME" Launches to Unravel How Environment Shapes Our Health

European researchers join forces in a four-year effort to understand the "exposome" – the sum of all environmental exposures – and its impact on public health and environmental sustainability

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Athens, Greece, 6 May 2025 – Air pollution, noise, bright artificial light, and hazardous waste are all around us – and they can have a great impact on our health. Today marks the kickoff of a groundbreaking European research initiative called ENVESOME ("The Environmental Exposome and Health"), which will study how the combination of these environmental factors over our lifetime contributes to chronic diseases such as heart and lung conditions, sleep disturbances, and mental health issues. Funded by the European Commission's Horizon Europe program, the four-year project is led by the National Hellenic Research Foundation (NHRF) in Greece and involves 14 partner institutions across the EU. Its main objective is to strengthen the knowledge available to policymakers and provide new tools for understanding the links between pollution and disease at all stages of life.

Environmental factors are known to play a huge role in disease today. The World Health Organization estimates that about 12.6 million people die each year as a result of living

or working in unhealthy environments – nearly one in four of all global deaths. Traditionally, scientists and regulators have tackled issues like air quality or noise in isolation, focusing on one exposure at a time. However, in reality people are often exposed to multiple pollutants and stressors simultaneously, and these combined exposures can have a greater health impact than each factor on its own. This is where the concept of the exposome comes in. Instead of examining environmental risks one by one, the exposome approach studies all the exposures an individual encounters from conception through childhood and adulthood to old age. In simple terms, if the human genome is like a map of all our genes, the exposome is a map of all our environmental influences – everything we breathe, eat, drink, and experience in our surrounding environment over the course of our life. By capturing this full "environmental fingerprint" of a person, scientists can better understand how different factors interact and combine to affect our health.

ENVESOME will combine cutting-edge science, technology and data to investigate how these exposures truly impact us. Researchers in the project will collect data on environmental conditions (for example, measuring air quality, noise levels, and even light at night) and analyze how our bodies respond – using methods like human biomonitoring (chemical measurements in blood or urine) and advanced cell biology experiments. They will also employ artificial intelligence to sift through the data and detect patterns, making connections between exposure to pollutants and the development of disease. By integrating all this information, the team hopes to pinpoint how and when certain environmental exposures trigger health issues, and importantly, what can be done to prevent or mitigate these effects.

> *"For the first time, we have an international and interdisciplinary team examining the total environmental footprint on human health", said Prof. Dimosthenis Sarigiannis, ENVESOME's Project Coordinator and Director & Chairman of the Board of NHRF.*
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> *"ENVESOME is about connecting the dots between our environment and our well-being. By looking at everything from air pollution and noise to light and chemicals all together, we can understand their combined impact like never before. Our goal is to turn that science into practical solutions – helping people lead healthier lives and building more sustainable communities for future generations".*

In addition to research studies, ENVESOME will deliver tangible tools and solutions for different stakeholders. Notably, the project will develop:

- A mobile application for citizens – to help individuals learn about their personal exposure to pollution and discover how to better protect themselves.
- A decision-support system for policymakers – an AI-powered platform to guide authorities in making informed decisions and improving environmental health regulations.
- A pollution and health chatbot for healthcare professionals – to provide doctors and nurses with up-to-date guidance on the effects of environmental exposures on patients' health.

By testing these tools in real-world settings (urban case studies and "living labs"), the project will evaluate how effective they are in reducing exposure and improving health outcomes.

Ultimately, ENVESOME aims to translate its scientific findings into concrete actions that benefit society. The consortium plans to use the new evidence to update pollution limits and guidelines and to support targeted policy measures for healthier environments. It also seeks to promote healthy habits and awareness, so that people and communities can take steps to lessen the negative health effects of pollution. This international and interdisciplinary effort exemplifies how joint work between European institutions can tackle one of the most pressing challenges of our time – pollution and its impact on human health. By the end of the project, the ENVESOME team expects to provide not only new scientific insights, but also practical solutions and policy recommendations to better protect public health and foster environmental sustainability for years to come.

Media Contact:
National Hellenic Research Foundation – Athens, Greece
(Tel: +30 210 7273516; Email: eie@eie.gr)